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TITLE: Development of the Moffitt Cancer Network as a
Telemedicine and Teleconferencing Educational Tool for Health
Care Providers

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INTRODUCTION:

The Moffitt Cancer Network's (MCN) goal is to provide up-to-date oncology related information, resources, and education to oncology health care providers and researchers for the prevention and cure of cancer. Consistent with the aims of the Advanced Cancer Detection Center, the MCN provides access to educational programming, cancer control and clinical protocols, and a mechanism to exchange patient focused information leading to the improved detection and treatment of cancer. The MCN is health care provider focused and complements an array of existing public/lay information sources available elsewhere. It is built around the concept that oncology expertise is geographically centralized, multidisciplinary in nature and of limited availability. The MCN addresses these constraints by increasing availability through a World Wide Web-based design that enables wide access from many geographic locales. The objectives of this project are to:

- Collect and organize cancer information to provide educational content to physicians and other health care providers,

- Develop and implement software to encode video and audio to enable viewing over the Internet at a range of speeds (bandwidths),

- Implement a mechanism to deliver continuing education credits through on-line testing and automated submission/evaluation,

- Design and create a web page to permit easy sorting, searching and selection of educational programming,

- Design and create a web page to deliver physician referral information that includes submission of an electronic case record consisting of text and imaging data, and

- Provide access to case conferencing from remote locations using easily available audio/video to the desktop.

BODY:

Task 1. Collect and organize cancer information to provide educational content to physicians and other health care providers. (Months 1-24).

A schedule of events is determined in coordination with the Moffitt Office of Conference Planning, the USF Department of Education, the USF Department of Continuing Medical Education and independent researchers wishing to present. These events include: Grand Rounds, the monthly meeting of the Cancer Control Research Interest Group (CCRIG), Tech Topic (for medical information technology staff), a number of national and local oncology conferences, as well as a number of JCAHO requirements for in-service education for nurses, physicians, and other hospital staff.

The MCN currently has 304 presentations in its library, increasing at a rate of 9.2 presentations per month on average (an increase from 4.8 per month the previous year). Additionally, 12 conferences sponsored by USF and Moffitt are also currently available online.

Schedule videographer coverage of grand rounds and research conferences.

The Network Coordinator in cooperation with Moffitt Department of Education and the Moffitt Multimedia Educational Research Center compiles a schedule of events. This schedule is used to determine the scheduling needs of the MCN videographer. The MCN videographer provides audio and video capture of these events digitally and to 90 minute DVCAM (Digital Video Camera) tapes when appropriate. MCN has almost completed the move to a fully tape-less environment.

Coordinate notification of nursing, pharmacy and other health care providers continuing education presentations.

The Moffitt Department of Education notifies the MCN of all continuing education presentations and obtains a release from all speakers that permits the distribution of their respective presentation by the MCN.

Organize the videotaping of faculty scientific presentations for national oncology conferences.

The notification and videotaping of national oncology conferences is scheduled in accordance with the system mentioned above, developed in coordination with the MCN and the Moffitt education department. A number of conferences have been added to the MCN library. These presentations are digitized and are made available on the MCN website. The presentations acquired by this activity are codified by continuing education, searchable by subject and grouped by their respective conference title.

Coordinate with the Department of Education notification and scheduling of relevant conferences.

The Moffitt Department of Education notifies the MCN of all relevant conferences and the MCN videographer is scheduled in accordance with the videotaping needs of each conference.

Task 2. Develop and implement software to encode video and audio to enable viewing over the Internet in a range of speeds (bandwidths). (Months 1-24)

Explore the application of the Tag development software to support multiple video connections and the impact on network bandwidth.

The MCN has developed a process of digitizing presentations using the Digital Renaissance Tag Composer. Through this process MCN is able to stream presenter's slides and audio simultaneously by using a Synchronized Multimedia Integration Language (SMIL) script file. MCN originally encoded presentation for distribution over ISDN speeds of 128k and modem speeds of 56k. The encoding process used previously created two-network streaming formats, one for ISDN speed connections at 128 kilobytes per second and a second format for current modem technology speeds of 56 kilobytes per second or less. Using the Real media server software, users linking to a presentation acquire the format (streaming speed) appropriate for their connection bandwidth. The server and the user's player handle this process automatically. Late in August 2000 MCN determined that the ISDN format was redundant, as it did not offer any significant improvement over the modem format due to the low frame rate of the presentations being developed (sometimes as low as one frame for every three minutes), and MCN has discontinued the encoding an ISDN bit rate media file and thus lowering the production time.

In July of 2000 MCN began to explore the use of the Microsoft Media suite of tools for development of online course content. Microsoft Media provides significant advantages in bandwidth reduction, production and administration time, and potential audience. The MCN has since migrated all processes to Microsoft Media. Windows Media supports a process called Multiple Bit Rate (MBR) video. Put simply, MBR video allows MCN to create a presentation geared toward either low (those users below 128k) or high (those users above 128k) bandwidth. The software determines the minimum speed required by the presentation to stream then negotiates between the client computer (the user) and the server the most bandwidth conserving connection. Using MBR video we are able to stream presentations at 28-32k which previously required 56k+ using Real media. In March of 2000 MCN began the process of converting all assets previously developed in Real media to the Microsoft Media format to better serve our users.

In August of 2001 MCN completed the conversion of all assets to Microsoft Media and began using Windows Media version 7, this provided significant quality improvements over Windows Media version 6.4 while reducing bandwidth requirements. Currently, MCN is testing the Windows Media 8 Codec which provides significant improvements in quality and drastically reduces bandwidth requirements from version 7.

Evaluate alternative connectivity models, including cable modem connections or access to cable networks as a means to enhance distribution of educational content.

The MCN has evaluated multiple alternative connectivity models, including cable modems, ISDN, ADSL, and traditional T1 & T3 service lines. We have found that cable modems are an excellent method of distributing educational content. Cable modems provide a low cost, high bandwidth alternative for the user. This allows

educational content to become more dynamic and interactive increasing the quality and effectiveness of the educational activity.

Evaluate the Internet 2 as to its availability to sustain the necessary bandwidth for the Moffitt Cancer Network. Moffitt Information Technology is currently evaluating Internet 2. Development in this area will depend on the more general availability of the Internet 2 to MCN users.

Resolve firewall and security issues to provide secure communication for clinical data as well as to adequately deal with subscriber/user requirements for security to permit desktop access.

A firewall has been put in place to ensure secure communications for clinical data and to address user security issues. Moffitt IT, in coordination with the MCN is currently working to develop firewall policy relating to streaming media. In August 2000, MCN moved towards streaming media as UDP packets, as opposed to only TCP packets. By doing so, caching of media streams is nearly eliminated. This required an extensive review of firewall issues. We are now looking at new processes that will embellish firewall security. Only designated ports will be available to predetermined medical professionals. In addition, data will only be available at pre-selected times and with pre-selected permission or authorization levels.

Uniform Resource Locator based on specific one-time virtual names.

All prerecorded media is encrypted when necessary and has a unique access requirement for specific use. Additional security methods are still being researched and firewall security is a priority.

Expand the number of Authorized users to the Moffitt Cancer Network.

Expansion of authorized users is critical to the digital convergence with MCN's ongoing research and development. We are now capable of delivering "On-demand", encrypted, and live media to desktops both user specific and publicly when appropriate. In addition, with the recent addition of continuing credit hours for nursing, we have opened a huge medical audience for MCN. It should be noted that there is no requirement to register or become authorized in order to watch most presentations available on the MCN.

Authorized users increased from 2 to 16 in the year 2000, an increase of 800%.

In mid 2001 a distinction was made between "authorized" and "registered" users. Authorized users are groups of predetermined people who are authorized to view a particular type of content. Registered users are either authorized users who have taken the time to register or non-authorized users who have registered for CME purposes. Authorized, registered users (previously referred to as just "authorized" users) increased from 16 to 68, an increase of 425%, in the year 2001.

Due to recent outreach programs our user base continues to grow. So far this year, the number of authorized, registered users has increased from 68-90, an increase of 32% in less than two months. Over 200 authorized users were added last month. The number of fully registered users continues to rise at a steady rate. With new programs with Moffitt affiliate hospitals we expect the number of registered users to multiply ten fold over the next year.

The number of authorized or registered users reflects a segment of the utilization of the Moffitt Cancer Network. The overall usage statistics are a more valuable statistic to determine utilization. The statistics (below) show a regular progression in utilization over the past year of the Moffitt Cancer Network. The statistics are separated into internal (users internal to Moffitt Cancer Center) and external (those accessing via the internet). The combined value displays the number of presentations watched and the average number of presentations watched per user. Important to note is the number of sessions (visits) and number of presentations watched per month. The statistics show a regular increase from month to month in site utilization.

MCN Statistics 2001/2002

As of 02/08/02

Web Stats

	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	2-Jan	Total
Internal													
Sessions	127	212	186	213	260	339	277	190	372	699	315	280	3470
Hits	743	1293	1616	1450	1743	2196	2295	679	6,289	5298	1998	1814	25600
H/S Ratio	5.8504	6.0991	8.688	6.808	6.704	6.478	8.285	3.574	16.91	7.579	6.343	6.479	
Unique Vis	54	75	65	89	71	114	127	106	176	398	163	134	
S/U Ratio	2.3519	2.8267	2.862	2.393	3.662	2.974	2.181	1.792	2.114	1.756	1.933	2.09	
External													
Sessions	99	210	503	885	813	840	795	716	800	708	913	1167	8449
Hits	408	608	1687	2207	1941	3166	2271	1743	2552	2649	3676	4523	27431
H/S Ratio	4.1212	2.8952	3.354	2.494	2.387	3.769	2.857	2.434	3.19	3.742	4.026	3.876	
Unique Vis	68	147	200	442	310	433	401	375	426	489	480	593	336
S/U Ratio	1.4559	1.4286	2.515	2.002	2.623	1.94	1.983	1.909	1.878	1.448	1.902	1.968	
Combined													
Pres Watch	5	34	245	79	140	534	271	89	114	222	186	276	2195
P/U	0.04	0.15	0.92	0.15	0.37	0.98	0.51	0.19	0.19	0.25	0.29	0.38	

*H/S Ratio represents the average amount the users explorers the site

*S/U Ratio represents the average number of times users returns

*P/U Ratio represents number of videos the average user watched that month

Task 3. Implement a mechanism to deliver continuing education credits through on-line testing and automated submission/evaluation. (Months 1-24).

Arrange for automated notification of Department of Education staff for each new presentation selected for the Moffitt Cancer Network.

Prior to inclusion in the MCN, the Moffitt Department of Education reviews each presentation for quality of educational content.

Establish ongoing procedures to obtain releases, objectives and CME questions to implement to permit encoding of presentations and inclusion onto the Moffitt Cancer Network.

Presenters sign a release to rebroadcast prior to the videotaping of their presentation. The Moffitt Department of Education works closely with the presenter and the MCN to establish objectives, determine appropriate CME questions and evaluate the overall quality of the educational content of the respective presentation. Upon the completion of this work, all information is passed to the MCN for inclusion into the MCN website for delivery to the user.

Create documentation and procedures to collect appropriate demographics on individuals desiring CME and implement electronic automated notification of our Continuing Education Office to authorize and verify CMEs earned.

Appropriate demographic information is collected from all individuals wishing to receive CME credit for physicians or nurses contact hours. Upon completion of a CME credit or contact hours, the MCN staff is electronically notified. The results of the activity are graded electronically and the information is forwarded to the USF Education Department if a CME credit or contact hour was in fact earned.

In early 2001 MCN developed a process whereby all relevant information pertaining to the educational activity and credit received is transmitted via an encrypted data string directly into the USF Continuing Education certificate processing cue upon satisfactory completion of credit requirements. This eliminates a number of

steps while reducing the probability of error. MCN currently uses a redundant system whereby USF Continuing Education records are audited each month against MCN records to ensure proper certificate issuance.

Automatically link the Cancer Library to the acquisition process so that they are aware of new acquisitions and receive opportunities to extract key words for indexing, sorting and searching.

Upon the completion of the digitization of a presentation, the digitized presentation is forwarded to the Cancer Center Librarian for review. The Cancer Center Librarian extracts key words used for indexing, sorting and searching presentations on the MCN website. These keywords are added to the MCN website database for each respective presentation.

Extend the CME process to include CEUs for nursing and pharmacy.

The MCN currently offers CME credit for physicians as well as, more recently added, contact hours for nursing continuing professional education (CEU). The certifications are provided in cooperation with the USF College of Medicine and Nursing, respectively. We are continuing to explore the applicability of the content to other healthcare providers, such as pharmacists, and the requirements to offer continuing education credits.

Expand the educational content offerings to include mandatory requirements for risk analysis, HIV, infection control, etc.

The MCN has expanded the educational offerings to include a number of JCAHO requirements for nurses, physicians and staff. These offerings are available internally to all personnel via the Moffitt Cancer Center Intranet.

Task 4. Design and create a web page to permit easy sorting, searching and selection of educational programming. (Months 1-24)

Organize educational content along primary audience lines and develop a key word searching algorithm to subset for presentations.

An algorithm has been developed allowing keyword searching. The keywords are determined during the review of the presentation by the cancer center library. A new algorithm was developed this year allowing a more efficient search. The MCN website provides chronological ascending/descending, keyword search, search within results, and presenter last name, first name searches.

Implement a database for key words according to a standard nomenclature, utilizing NLM MeSH headings, cancer site, etc.

A keyword database has been created and is used by the MCN website for searching. The keywords are determined by the Cancer Center Librarian prior to the addition of a presentation to the MCN. The keywords are based on NLM MeSH standards.

Expand implementation of Active Server Page (ASP) extensions to the multimedia hypertext (HTML) by adding onto the 'back-end' of the Web application i.) procedural language scripting and ii.) the ability to exchange information with a fully functioning database.

ASP has been used throughout the site to produce dynamic, database driven web pages. ASP is used in all areas of the site to set procedural paths, increase security and generate dynamic content from the MCN databases.

Expand and refine the JET database to incorporate user defined search phrases that are located within a variety of fields associated with the database, including a textual 'objectives' section, MeSH headings, cancer site, canned search categories, etc.

The MCN has increased the capability of the Jet database to allow user defined search phrases. These phrases search for matches in the textual 'objectives' section, MeSh headings (keywords), cancer site, and canned search categories.

Monitor utilization by remote site to evaluate the frequency and demand for various types of educational content to permit refinements and revisions to improve offerings.

The MCN gathers extensive information in regards to use of the MCN website. This information includes website traffic, time spent, keywords searched for, the number of presentations watched, for credit or not, and the frequency with which each presentation is watched.

MCN has begun a user survey, whereby a group of physicians either internal or external to Moffitt are asked to review the Moffitt Cancer Network website and its offerings. The user is then given a user survey and a semi-structured interview. Through the survey, MCN is gathering very productive feedback pertaining to usability, quality, and content applicability. Through the interview, MCN is gathering information pertaining to the needs and wants of its users. An unexpected result of this survey is an increase in utilization from some of Moffitt's affiliate hospitals and satellite clinics. We plan to make this an ongoing process.

Task 5. Design and create a web page to deliver physician referral information that includes submission of electronic case records consisting of text and imaging data. (Months 1-24)

Develop and implement a database to archive text and imaging data for retrieval by consulting Cancer Center physicians and integration with Moffitt Cancer Center clinical information systems.

Moffitt has a DICOM server which, when combined with secure Internet protocols, may be used to transmit and receive DICOM-compliant images to and from partners on the Internet. These images are securely relayed to and from Moffitt's PACS viewing stations. This technology has been proven to work in experiments with the Haley Veterans' Administration Hospital and Cornell University. Radiology is currently working with Morton Plant Hospital to develop a permanent, Internet-based method of exchanging patient radiographic images.

Develop a structured computerized clinical case description that provides a minimally relevant set of data that describes a clinical case for second opinion and consultation.

Efforts to date have focused on image transfers and the capability to be DICOM compliant. Appropriate mechanisms have been developed along with interfaces to hospital PACS and Radiology Departments. Exploration is currently underway to exchange textual information and establish the computerized clinical case record.

Acquire hardware and software to provide audio and video real time and time shifted streaming of case conferencing to remote locations for user viewing over secure communication links.

In July 2000 MCN procured rack mounted dual processor servers and audio/video equipment for the purpose of providing both real-time streaming of media as well as simultaneous capture of that media for archive.

In December 2000 MCN began exploring the use of low-cost, low bandwidth one-way and two-way case-conferencing equipment. This is equipment that would allow the patient to contact and conference with their respective physician without leaving their home. A preliminary trial of the equipment is currently underway.

In October 2001 MCN began streaming a monthly genetics case conference to our affiliate hospitals.

Establish the necessary gateways and bridges to provide connections at a range of bandwidths to support remote connectivity.

Moffitt has implemented a secure remote process whereby authorized positions can access selected Moffitt records remotely.

As of February 2001, all necessary gateways and bridges have been put in place and 90% of critical functionality may be controlled remotely. Requirements are reviewed on a regular basis by Moffitt IT staff.

Design and implement web-based front ends to Moffitt Cancer Center clinical systems to permit secure access to patient information of patient's referred or submitted to case conferencing or second opinions.

MCN and Moffitt have collaborated to create a total package for streaming media distribution. Internally, Moffitt is hardware ready to multicast media events and, with the establishment of a new dedicated media server in August 2000, it has implemented a load-balanced high bandwidth portal for streaming media for both the Intranet and Internet. In addition, using specified unicast stations, MCN can deliver media events to other facilities that can multicast and therefore reducing the bandwidth load on MCN's media server.

Task 6. Provide access to case conferencing from remote locations using easily available audio/video to the desktop. (Months 1-24)

Complete telegenetics experiment to assess feasibility and acceptability of this format for the exchange of clinical information.

Telemedicine began to accrue subjects on May 11, 2000. To date, 15 individuals have been asked to participate in the study, and 11 were enrolled. Based on these numbers the participation rate in the study is 73%.

Preliminary data shows that there is no significant difference in patient satisfaction between patients in a face to face encounter and patients in a telemedicine encounter.

Of those who refused to participate:

- none had any prior experience with video conferencing

Of those who participated:

- nine were non-Hispanic white, one was African American and one was Hispanic.
- three out of eleven had had some kind of video conferencing before, which was related to their work.
- three out of eleven had been a part of some kind of research.
- six out of eleven were randomized to Telemedicine counseling, while five out of eleven had face to face counseling
- The overall satisfaction level was very satisfactory for six of those who were in the Telemedicine counseling arm (6)

The overall satisfaction level was very satisfactory for four and satisfactory for one of those who was in the Face to Face counseling arm (5)

Implement additional sites to expand this program and resolve billing issues within the context of existing laws and regulations regarding telehealth and teleconsultation programs.

MCN has begun building the administrative infrastructure to deal with access, billing and scheduling issues. This includes a point of contact to receive requests, coordination of schedules for presentations and an administrative web-based front end to view a calendar of presentations and establish the appropriate login and passwords for approved permissions. New legislation is expected during the current legislative session that will have a direct bearing on regulations governing telemedicine and telehomecare.

The genetics department is currently in discussions with two central Florida hospitals to expand the Moffitt genetics program to their locations via telemedicine.

MCN plans to expand the telegenetics study into the Community Clinical Oncology Program and is evaluating funding possibilities to do so.

Establish the necessary gateways and bridges to provide connections at a range of bandwidths to support remote connectivity.

See, also Task 2. All processes are controlled remotely and is designed for live to archive times of no more than 5 minutes. In other words, five minutes after a live broadcast event is completed, an "On-Demand" rebroadcast will be available to specific users. The former being broadcast via secure port and virtual link and the latter are encrypted for use with a specific key.

Develop tunneling or other secure links to resolve firewall issues regarding LAN configurations at both the Moffitt Cancer Center and remote sites.

Moffitt is using Virtual Private Networks now.

Acquire and install technology in conference centers where case conferencing generally occurs for selected clinics to permit retrieval and display of multiple images and clinical data submitted for this purpose by remote users.

All hardware has been purchased for this project and a formal walkthrough and equipment installation has taken place. For each possible site, a detailed plan of operations has been developed to establish the capability to schedule and transmit signals for MCN distribution. MCN has purchased and will implement within the next few weeks streaming equipment for Pathology. This system will include audio capture and image capture from microscope slides and x-rays as well as the audience during discussions.

As of March 2001, MCN has successfully completed the installation of case conferencing equipment in two primary conference centers.

Assess utilization of this technology to refine and revise formats and improve the quality and ease of remote access.

As noted previously, MCN has made it a priority to improve the quality of its products. Moving towards the use of Microsoft products and its MPEG-4 streaming format will reduce labor and increase quality across the board. MCN will be writing new programs for remote control of streaming servers and changing its current database into an SQL based database which will improve speed and increase capacity. Finally, changes in its business practices will reduce labor and increase its quality and functionality as well as increase its customer base.

MCN continues to work capability and functionality, improving video quality, and lowering bandwidth requirements for the user, while at the same reducing the production time by streamlining and automating the process.

KEY RESEARCH ACCOMPLISHMENTS:

- The Moffitt Cancer Network is available to users and can be found at <http://network.moffitt.usf.edu>
- The MCN currently has 304 presentations in its library, increasing at a rate of 9.2 presentations per month on average. Additionally, 12 conferences sponsored by USF and Moffitt are also currently available online.
- All approved Grand Rounds presentations have been taped by the Moffitt Multimedia Education Resources Center (MERC) for over one year preceding this report. The video is captured on digital DVCAM 94 minute tapes.
- Since many of the presenters use only 35mm slide for their presentations, a process of creating final production audio/video Real media for streaming via TCP/IP has been developed. This process requires post-production labor and requires the best of the video's individual frames to be captured a second time to recreate higher quality computer images. MCN has made significant progress in this area and as of June 2000 began using presenter's PowerPoint files whenever possible to bypass the second image rendering process. This has reduced labor time from 3.5 days to about 5 hours, while increasing image quality noticeably. This labor savings is not realized when presenters are using 35mm film only.
- In addition to pre-presentation file acquisition, MCN has begun the development of a presenter packet. When finished, this packet will inform presenters to repeat important questions asked at the end of events like Grand Rounds and these will be added to the content to be available to medical professionals at the MCN website.
- National oncology conferences have been taped and included in the MCN website database. •Conferences have been subdivided into their respective presentations and are categorized searchable as well as searchable using the website database Access Jet engine. All conferences are pre-qualified for their ability to become

online educational materials by the University of South Florida College of Medicine and, more recently, the University of South Florida College of Nursing.

- MCN is now beginning to test and research a second media streaming process using MPEG-4. Not standardized by the World Wide Web Consortium yet, the newly introduced streaming format allows for embedded script and control processes within the media stream.

- MCN has almost completed the transition to tape-less acquisition of content. We expect to complete the move in the coming months. Currently, more than 90% of our content is acquired in a tape-less environment.

REPORTABLE OUTCOMES:

- Patents and licenses applied for and/or issued;

A notice of disclosure has been filed with the USF office of patents in anticipation of the completion of a patent application.

- Presentations

The Moffitt Cancer Network Vision, Jeffrey Krischer, Ph.D. April 2001

The Moffitt Cancer Network, Lessons Learned and New Directions, Matthew Clark, B.S. October 2001

CONCLUSIONS:

The purpose of this research is to create processes that allow medical professionals to extend their abilities through the use of electronic media. MCN has evolved in pace with the change of that technology and because of its foresight and its dedication to purpose it has kept ahead of the technology. MCN has realized that streaming media processes are not yet capable of high definition presentations at low bandwidth and has developed the best possible processes for producing usable educational media delivery using network technology. MCN's research into these processes has revealed the need for specific products and their uses. Several new programs will be developed to address these. For example, to cut down on the need for many new employees, MCN will be developing a broadcast program that will allow a single user to set start/stop times on a given event at a given location. In addition, this program must have a simple user interface that a cameraman will be familiar with, similar to a tape recorder.

Further investigation into security processes must be addressed when MCN implements streaming from doctor to doctor in case reviews including new HIPAA requirements for medical privacy and confidentiality.

Providing second opinion and expert information to referring physicians is an extremely important addition to MCN's research. While continuing education is a given, in the final analysis, it may be in the medical professional interaction that MCN becomes most useful.

REFERENCES: None

APPENDICES: Utilization Statistics, Feb 2001 – Jan 2002
List of Personnel

MCN Statistics 2001/2002
As of 01/31/02

		Web Stats													
		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	2-Jan	Total	
Internal	Sessions	127	212	186	213	260	339	277	190	372	699	315	280	3470	
	Hits	743	1293	1616	1450	1743	2196	2295	679	6,289	5298	1998	1814	25600	
	H/S Ratio	5.85039	6.09906	8.6882	6.8075	6.7038	6.4779	8.2852	3.5737	16.91	7.5794	6.3429	6.4786		
	Unique Vis	54	75	65	89	71	114	127	106	176	398	163	134		
	S/U Ratio	2.35185	2.82667	2.8615	2.3933	3.662	2.9737	2.1811	1.7925	2.114	1.7563	1.9325	2.0896		
External	Sessions	99	210	503	885	813	840	795	716	800	708	913	1167	8449	
	Hits	408	608	1687	2207	1941	3166	2271	1743	2552	2649	3676	4523	27431	
	H/S Ratio	4.12121	2.89524	3.3539	2.4938	2.3875	3.769	2.8566	2.4344	3.19	3.7415	4.0263	3.8757		
	Unique Vis	68	147	200	442	310	433	401	375	426	489	480	593		
	S/U Ratio	1.45588	1.4286	2.515	2.0023	2.623	1.94	1.983	1.909	1.878	1.4479	1.9021	1.968		
Combined	Sessions	226	422	689	1098	1073	1179	1072	906	1172	1407	1228	1447	11919	
	Hits	743	1901	3303	3657	3684	5362	4566	2422	8,841	7947	5674	6337	54437	
	H/S Ratio	3.29	4.50	4.79	3.33	3.43	4.55	4.26	2.67	7.54	5.65	4.62	4.38		
	Unique Vis	122	222	265	531	381	547	528	481	602	887	643	727		
	S/U Ratio	1.85	1.90	2.60	2.07	2.82	2.16	2.03	1.88	1.95	1.59	1.91	1.99		
Pres Watch		5	34	245	79	140	534	271	89	114	222	186	276	2195	
P/U		0.04098	0.15315	0.9245	0.1488	0.3675	0.9702	0.5133	0.185	0.189	0.2503	0.2893	0.3796		

*H/S Ratio represents amount of time user spends on site per visit

*S/U Ratio represents the average number of times users return

*P/U Ratio represents number of videos the average user watched that month

Web Stats												
Visits By Region												
	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total
N America	83	167	442	762	432	764	596	538	726	597	434	6597
Undeterm	12	31	26	73	61	0	149	139	10	74	48	629
W Europe	1	3	17	24	76	28	13	14	36	21	13	301
Asia	0	2	1	4	3	11	6	5	19	7	17	96
Austrailia	0	1	0	1	4	11	1	2	3	0	9	36
N Europe	3	1	1	2	4	3	2	4	2	4	0	30
Mid East	0	0	4	3	0	3	0	0	2	1	0	20
S America	0	2	0	3	2	3	0	1	1	3	0	19
E Europe	0	0	1	1	2	5	0	2		0	0	16
Africa	0	0	0	0	6	1	0	0	1	0	0	8
Car Island	0	0	2	0	0	0	0	1	0	1	0	6
Pac Island	0	0	0	0	0	0	0	1	0	0	1	2
N Africa	0	0	0	0	0	0	0	0	0	0	0	1

Top Ten Requested Activities - Jan 01 to Current		
No.	Title	# Requests
1	Bioterrorism	223
2	Prediction and Modification of Cancer Risk in BRCA1 and BRCA2 Mutation Carriers	49
3	Domestic Violence	37
4	EDRN - Joining & De-Identifying Data for Anonymous Query	28
5	Multiple Myeloma: Diagnostic & Therapeutic Challenges	24
6	Human Hematopoietic Stem Cell	22
7	Moffitt Web Strategies and the New Face of the Moffitt Web Site	21
8	Experimental Treatment Options for Patients with Metastatic Melanoma	20
9	Advances in Surgical Oncology - From Lymphatic Mapping to Cancer Immunotherapy	18
10	Selective Stem Cell Survival in Preclinical Settings Using Targeted DNA Repair	16

List of Personnel Receiving Pay from Research Effort:

Christina Broesler
Julio Cabrera
Jim Champion
Matthew Clark
Alex Hogan
Kevin Morrison
Josh Paine
Diego Pelaez
Josh Pila
Jacquiline Davis